THE CORRELATION BETWEEN DIETARY PATTERNS OF FOOD ANIMAL ORIGIN AND RISK OF BREAST CANCER IN BANDA ACEH

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ABSTRACT

The research was aimed to investigate the correlationbetween food animal origin dietary patterns and breast cancer in Banda Aceh. This case-control study compared the dietary pattern of food animal origin between 45 breast cancer patients and 45 age-matched controls. Six dietary patterns were difined by food frequency questioner(FFQ): food animal origin, preserved of food animal origin, processing of food, fats andoils, vegetables and fruits patterns. Preserved of food animal origin were significantly associated with the incidence of breast cancer with an odds ratio (OR) 5.86 [95% confidence interval (CI) =1.49-21.65] respectively; p=0.013; while food animal origin, processing of food, fats and oils, vegetables and fruits dietary patterns were not associated with the incidence of breast cancer. The conclusion of the research that salt fish and keumamah play an important role of the association.

Keywords : Breast cancer, dietary patterns, food animal origin

Introduction

Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in females in worldwide. Genetic and environmental factors both contribute to the development of breast cancer (Wu, et al., 2012). It is known that about 5-10% of all cancers are caused by genetic defects, while the rest of 90-95% are caused by environmental factor and lifestyle, including diet (30-35%), tobacco smoking (25-30%), and alcohol (4-6%). Diet represents 30–35% of risk factors (Sutandyo, 2010). Classifications of dietary patterns were : (i) Healthy pattern: diet with a high content of fruits, vegetables, poultry, fish, whole grain cereals and a low daily intake of fats. (ii) Unhealthy pattern: diet with high content of red meat and/or processed meat, refined sugars, potatoes, sweet foods and a high daily intake of fats. (iii) Drinker pattern: diet with a high content of wines, beers and liquors (Ruiz and Hernandez., 2013). The incidence cancer in Aceh was 1,4 per milion and mostly woman (Riskesdas, 2013). The most convincing evidence on meat association with canceris from processed meat. The common use of this term refers to meats preserved by the addition of preservatives, or by smoking, curing, or salting (Janozcka et al., 1999). The epidemiological studies over the past 10 years have shown that high intake of well-done meat and high exposure to meat carcinogens, particularly HCAs, may

increase the risk of stomach, colon, and breast cancers in humans (Kampman, Slattery, Bigler, Leppert, & Samowitz, 1999). Therefore prevention of breast cancer is now considered of major public health importance. Means for reducing the burden and particularly dietary

modifications. This study was aimed to investigate the correlation between food animal origin dietary patterns and breast cancer in Banda Aceh.

Material and Method

All diagnosed 45 breast cancer patients that visited surgery pathology oncology hospitals and clinics (i.e "Zainoel Abidin Hospital ", Ibu dan Anak Hospital" and "Ayu Ningsih Oncology Clinic") between June and July, 2014, were contacted to participate in diagnosis breast cancer. Control were 45 subjects were selected on a volunteer basis, and they were without any clinical symptoms or suspicious of any type of cancer in their medical history with age matching. Characteristic variables that were recorded were: age, educational level measured by years of school, occupation, marital status categorized as single and married, genetic categorized as yes and no and physical activity. Dietary habits of the past year were assessed through an six items namely, food animal origin, preserved of food animal origin, processing of food, fats andoils, vegetables and fruits patterns by using food-frequency questionnaire (FFQ). The participants were asked how often (i.e., never, seldom 1-3 times/month, often 1-4 times/week, and very often 1–6 times/week).

Result and Discussion

Characteristics of breast cancer and control group are shown in Table 1. A higher percentage of patients of breast cancer was not married, had graduate elementry school, as a housewife as compared to controls. Food intake of preserved of food animal origin were significantly associated with the incidence of breast cancer with an odds ratio (OR) 5.86 [95% confidence interval (CI) =1.49-21.65] whereas the other dietary patterns were not. The p value for the linear trend was statistically significant (p = 0.013) (Table. 2).

This study demonstrated a significant association between a preserved food animal origin dietary pattern and breast cancer and also demonstrated that breast cancer patients with preserved food animal origin dietary pattern consumed more than the control group. Heterocyclic amines (HCAs) are mutagenic and carcinogenic compounds that are present at parts per billion levels in cooked muscle foods, mainly meat and fish, through the Maillard reaction with createin/creatinine, amino acids, and sugars as the precursors (Janoszka, Blaszczyk, Damasiewicz-Bodzek, & Sajewicz, 2009; Pais, Salmon, Knize, & Felton, 1999; Sugimura, 2002). Lauber and Gooderham (2010) reported that the carcinogenic heterocyclic amines (HCA) formed during the cooking of meat have been proposed as candidate etiological agents of diet-associated neoplastic disease.

These findings emphasis the range and potency of the biological activities associated with this cooked meat product and mechanistically support the tissue-specific carcinogenicity of the chemical. Heterocyclicamines (HCAs) are mutagenic and carcinogenic compounds that are present at parts per billion levels in cooked muscle foods. Puangsombat et al (2011) reported that cooking conditions and ingredients influenced the level of HCAs in these Ready To Eat (RTE) products and concluded that consumption of RTE meat products contributes very little to HCA intake. A similar result were reported in 2007 by Steck, et al, modest increased risk was observed among postmenopausal, but not premenopausal, women consuming the most grilled barbecued and smoked meats over the life course (OR = 1.47; CI =1.12–1.92 for highest vs. lowest tertile of intake).

Table 1. Characteristics of participants according to breast cancer group/control group

Characteristics	Breast cancer N = 45		Control group N = 45	
	n	%	n	%
Marital Status				
- No	3	6.7	4	8.9
- Yes	2	93.3	41	91.1
Education				
- Illiteracy	6	13.3	3	6.7
- Elementry school	10	22.2	5	11.1
- Junior high school	7	15.6	5	11.1
- Senior high school	15	33.3	19	42.2
College	5	11.1	11	24.5
- Master or PhD	2	4.4	2	4.4
Occupation				
- Housewife	36	80	24	53.4
- Farmer	3	6.7	1	2.2
- Merchantment	1	2.2	2	4.4
- Private	0	0	4	8.9
- Government employee	5	11.1	14	31.1
Age				
- < 50	29	64.4	33	73.3
- > 50	16	35.6	12	26.7
Genetic				
- Yes				
- No	4	8.9	-	-
	41	91.1	45	100
Exercise				
- Yes	4	8.9	-	-
- No	41	91.1	45	100

Wu et al, (2013) reported that five dietary patterns were defined the meat-fat, pickle-vegetable, sugar fried food, soy, and coffe egg patterns. For the meat-fat dietary pattern, the third quartile and fourth quartile were significantly associated with higher breast cancer risk than the first quartile and second quartile with an odds ratio of 2.86 [95% confidence interval (CI) = 1.25-6.53] and 3.11 (95% CI = 1.33-7.27) respectively; p =0.002. In addition, cooking with oil was reported significantly more often in the fourth meat-fat dietary pattern quartile, as shown by the responses to the questions about cooking methods.

Table 2. Dietary patterns participants according to breast cancer group/control group

Dietary patterns		Participants					
		Breast cancer N = 45		Control group N = 45		p	OR (95% CI)
		n	%	n	%		
Food animal origin	Healthy pattern	38	84.4	41	91.1		1.88
	Unhealthy pattern	7	15.6	4	8.9	0.52	
Preserved of food animal origin	Healthy pattern	32	71.1	42	93.3		5.68
	Unhealthy pattern	13	28.9	3	6.7	0.013	
Processing of food	Healthy pattern	32	71.1	36	80		1.62
	Unhealthy pattern	13	28.9	9	20	0.46	
Fats andoils	Healthy pattern	31	68.9	24	53.3		0.51
	Unhealthy pattern	14	31.1	21	46.7	0.19	
Vegetables	Healthy pattern	28	62.2	23	51.1		0.63
	Unhealthy pattern	17	37.8	22	48.9	0.39	
Fruits	Healthy pattern	24	53.3	21	46.7		0.76
	Unhealthy pattern	21	46.7	24	53.3	0.67	

Puangsombat, et al (2012) reported the HCA content in cooked meat depends on type of meat, cooking methods, and cooking time and temperature. The primary HCAs in these samples were PhIP, MeIQx, and DiMeIQx. Type and content of HCAs in cooked meat samples were highly dependent on cooking conditions. The total HCA contents in cooked meat were 3.5 times lower if cooked to medium-rare rather than well-done degree of doneness. Fried pork showed higher total HCAs than fried beef and chicken. The skin of fried chicken contained a

significant HCA contents, therefore removing the skin before consuming can reduce HCA exposure. Total HCAs were briefly ranked in a decreasing order as follows: low HCA contents (>5 ng/g) found in baked beef, fried chicken without skin, medium-rare steak, and fried pork patty; intermediate HCA contents (5–10 ng/g) found in fried beef patty, fried chicken with skin, baked fish, and well-done steak; and high HCA contents (>10 ng/g) found in fried pork, fried fish, and fried bacon.

Conclusion

Preserved of food animal origin were significantly associated with the incidence of breast cancer. Food safety professionals recommend cooking methods to be used at home or in the food industry to reduce HCA formation in cooked meat products, will provide important information for use in estimating HCA exposure, and will facilitate investigation of the role of HCAs in the etiology of cancer.

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